

SOCIOECONOMIC
ANALYSIS
PROPOSED RULE

REGULATION 8, RULE 5:
STORAGE OF ORGANIC LIQUIDS

September 15, 2006

Prepared for
Bay Area Air Quality
Management District

Prepared by

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1. EXECUTIVE SUMMARY

INTRODUCTION

This report describes the socioeconomic impacts of proposed amendments to Regulation 8, Rule 5 that, if implemented, will help the Bay Area Air Quality Management District (District) to achieve and maintain state ambient air quality standards for ozone. Following this summary, the report summarizes the proposed rule requirements and describes the methodology for the socioeconomic analysis. The report also describes the economic characteristics of sites affected by the proposed rule amendments along with the socioeconomic impacts of the proposed amendments.

SUMMARY

The proposed rule amendments affect Bay Area businesses engaged in petroleum refining, petroleum bulk storage and terminal facilities, chemical manufacturing, and other chemicals and allied products wholesaling. Five oil refineries, six terminal facilities, 125 chemical manufacturing businesses, and 38 other chemicals and allied products wholesaling businesses will experience the greatest proportion of the impact resulting from the proposed rule amendments. The refineries are estimated to generate sales of \$4.9 billion per year and to realize net income of about 7 percent of sales, or \$344.7 million per year. Total annual sales at the six petroleum bulk storage and terminal facilities is estimated at \$547 million, of which, 2.7 percent (\$14.8 million) is estimated to be profit. Annual revenue at the impacted chemical manufacturing firms is estimated at nearly \$2 billion with 3 percent (\$59.6 million) profit. Finally, the other chemicals and allied products wholesalers are expected to generate \$204.3 million in revenue with \$5.5 million (2.7 percent) profit.

The compliance with the proposed amendments is expected to cost a total of \$12,187 per year. This represents less than one percent of profits for each of the impacted industries. Plus, this assumes that each individual industry bears the full

annual compliance cost. It is more likely that the total annual cost will be spread among all 174 impacted sites, not just five or six of them. Therefore, it is believed that the above percent of profits estimates are conservatively high.

The analysis concludes that the costs associated with compliance will not result in significant economic dislocation or job losses. For each of the impacted industries, the total annual cost of compliance is far below the 10 percent of profits threshold for significant impact. Additionally, small businesses will not be disproportionately impacted by the proposed amendments. In each of the impacted industries, the share of annual compliance cost borne by small business is far below small businesses' total share of those industries.

2. DESCRIPTION OF THE PROPOSED RULE

CURRENT STATUS OF THE RULE

Regulation 8, Rule 5 was adopted in 1978. It has undergone a number of revisions, most recently on November 27, 2002. The rule limits the organic emissions from liquid storage tanks. Most of the rule's current provisions were in place by the time of the January 1, 1993 amendments, however. Since, 1993, this rule has been the most stringent storage tank rule in California in the areas of:

- Basic emission control strategies,
- Gap standards for floating roof fittings,
- Closure requirements for floating roof fittings, and
- Tank degassing

This current revision proposes to set standards for limiting emissions during tank cleaning operations and create an innovative, voluntary self-inspection and repair program, while making other improvements to the rule.

The Bay Area 2005 Ozone Strategy includes a Control Measure, SS 9, for organic liquid storage tanks. The proposed amendments to Regulation 8, Rule 5 (discussed in the next section), incorporate the emission reduction measures in SS 9. Control Measure SS 9 proposes to improve standards for degassing and cleaning tanks and for storing removed sludges, and also to implement a self-inspection and maintenance provision to provide an incentive for more frequent tank inspections.

PROPOSED RULE AMENDMENTS

Pursuant to Control Measure SS 9, the District is proposing the following amendments to Regulation 8 Rule 5:

- 1) **New Exemption for Aboveground Gasoline Storage Tanks:** With the 1993 amendments, underground storage tanks subject to Regulation 8, Rule 7 were exempted from Rule 5. Because

both Rule 8-5 and Rule 8-7 specify pressure setpoints at which pressure vacuum valves will automatically operate, and because these setpoints are different for underground tanks in the two rules, this exemption was necessary to prevent a conflict. This exemption is provided for underground tanks, but not for aboveground tanks, because the setpoints for aboveground tanks are the same in Rules 8-5 and 8-7.

However, Rule 8-7 allows the setpoints specified in that rule to be superseded by a CARB order. If the CARB setpoints are not the same as the setpoints in Rule 8-5, then a conflict would occur. For this reason, and because Rule 8-7 already regulates both aboveground and underground gasoline tanks at gasoline dispensing facilities, it is appropriate to exempt both types of tanks from Rule 8-5. The proposed amendment of Section 8-5-116 extends this exemption to include aboveground gasoline tanks.

2) **Voluntary Self-Inspection and Repair**

Program: To encourage tank operators to undertake more frequent inspections of floating roof tanks, and to target their inspections on those tanks that are most likely to benefit from additional inspections based on their knowledge of tank conditions, a voluntary self-inspection and repair program is proposed with the following elements:

- i. 25% of the tanks at a facility, chosen by the operator, must have double the number of inspections normally required by the rule;
- ii. Minor non-complying conditions discovered by a tank operator at any facility tank are not subject to enforcement action if repairs are made within 48 hours;
- iii. Minor non-complying conditions discovered by District inspectors on any

facility tank continue to be subject to enforcement action.

- 3) **New Structural Integrity Requirements for Tank Shells, Flotation Pontoons, and Pressure Relief Devices:** Rule 5 currently requires that floating tank roofs and certain tank fittings be in “good operating condition,” but does not provide a definition of such condition. The proposed amendments provide a definition, as well as extending the standard to all tank roofs, to tank shells, and to pressure relief devices. Also, the proposed amendments make the prohibition against uncontrolled, leaking pontoons explicit and specify required emission controls for leaking pontoons.¹
- 4) **New Tank Cleaning and Sludge Handling Standards:** The proposed rule amendments provide limitations on the VOC content of cleaning agents, the use of steam cleaning, and also provide closure requirements for sludge containers. Rule 5 currently requires emissions controls when tanks are degassed prior to cleaning; however, since this rule does not currently require controls during the actual cleaning, the use of either cleaning agents with significant levels of organic compounds or steam as a cleaning agent may negate the benefits of controlling degassing emissions.
- 5) **Monitoring of Emission Controls During Tank Degassing:** To improve the Rule 5 standards associated with monitoring the emission controls required during tank degassing, this rule amendment proposes the following:

¹ Though Rule 5 does not currently address leaking pontoons, BAAQMD has considered such leaks to be a violation of the “good operating condition” requirement for floating roofs when they have occurred in the past.

- i. Addition of a 3-day prior notification requirement for degassing operations;
 - ii. A monitoring requirement for the 10,000 ppm residual concentration using a hand-held analyzer; and,
 - iii. Replacement of the annual source test requirement with a requirement to monitor actual emission control effectiveness periodically during degassing operations.
- 6) **Other Amendments:** Other amendments are proposed, which do not impose new emission control standards. Descriptions of these amendments are provided in Appendix A to this report.

EMISSIONS REDUCTIONS

Due to the high level of control already required by Rule 5, cost-effective emission reductions at storage tanks have become increasingly difficult to achieve. The amendments made in 1993 resulted in an estimated emission reduction between 2 ton/day and 3 ton/day by imposing tank degassing standards and more stringent seal gap and fitting closure standards for floating roof tanks. Primarily through the imposition of closure standards for slotted guide poles on floating roof tanks, amendments in 1999 achieved an estimated 0.87 ton/day reduction in volatile organic compound emissions. Furthermore, the 2002 amendments reduced volatile organic compound emissions by an estimated 0.13 ton/day, primarily by doubling the required inspection frequency for external floating roof tanks.

The remainder of this section details the emissions reductions expected to result from the proposed amendments.

VOLUNTARY SELF-INSPECTION AND REPAIR PROGRAM

This proposed amendment is expected to reduce emissions in two ways: 1) by identifying and repairing or replacing

damaged or worn tank components that would eventually lead to violations of rule standards and excess air emissions and 2) by reducing the maximum amount of time that a non-complying condition produces excess emissions by half.

The BAAQMD emission inventory for external floating roof tanks estimates 1.36 tons per day of organic emissions. The expected reduction in the incidence of non-complying conditions and of the duration of non-complying conditions is expected to result in a minor reduction in emissions at external floating roof tanks. An emission reduction of about 2% would result be equivalent to a reduction of 0.03 ton/day of organics.

NEW STRUCTURAL INTEGRITY REQUIREMENTS

Because tank shell leaks are very uncommon, that portion of the proposed amendment is not expected to result in significant emission reductions. Leaks on floating roof pontoons are less uncommon, though, and such leaks have previously been prohibited as a violation of the “good operating condition” requirement for floating tank roofs. The proposed amendments will make explicit the prohibition against uncontrolled, leaking pontoons, and specify required emission controls for leaking pontoons. Because uncontrolled, leaking pontoons have been prohibited in the past by the BAAQMD, no emission reduction estimate is provided for this proposed amendment.

NEW TANK CLEANING AND SLUDGE HANDLING STANDARDS

Based upon conversations with Bay Area refineries, it appears that tank cleaning operations already generally comply with the requirements proposed in this amendment. Also, state and federal hazardous waste regulations already impose handling requirements on most sludge removed from tanks. Sludge that is recycled on the site where it is generated may be exempt from these hazardous waste regulations, and only this small fraction of produced sludge will be affected by the requirements proposed in this amendment. Because only a limited amount of sludge will be subject to new requirements

due to the proposed amendments, no emission reduction estimate is provided for these amendments.

MONITORING OF EMISSION CONTROLS DURING TANK DEGASSING

Because the proposed amendments related to tank degassing do not impose new emission control standards, no emission reduction estimate is provided for these amendments.

OTHER AMENDMENTS

Because the other proposed amendments do not impose new emission control standards, no emission reduction estimate is provided for these amendments.

3. IMPACT OF PROPOSED RULE AMENDMENTS

This section of the socioeconomic analysis describes demographic and economic trends in the San Francisco Bay Area (Bay Area) region. Following an overview of the methodology for the socioeconomic analysis, the first part of this section compares the Bay Area against California and provides a context for understanding demographic and economic changes that have occurred within the Bay Area between 1995 and 2005. After an overview of Bay Area industries, we focus on the following industries:

- NAICS 32411, Petroleum Refineries
- NAICS 325, Chemical Manufacturing²
- NAICS 42471, Petroleum Bulk Stations and Terminals
- NAICS 42469, Other Chemical and Allied Products Merchant Wholesalers

Then the impacts on businesses within these industries of the proposed changes to Regulation 8, Rule 5 concerning storage of organic liquids are analyzed. For the purposes of this report, the Bay Area region is defined as Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.

3.1 METHODOLOGY

The socioeconomic analysis of the proposed rule amendments concerning storage of organic liquids involves the use of information provided directly by BAAQMD, as well as secondary data used to describe the industries affected by the proposed rule amendments.

Based on information provided by BAAQMD staff, ADE determined that the impacts would affect oil refineries, certain chemical manufacturers, wholesalers of certain chemicals and allied products, and petroleum bulk stations and terminals. In relation to the refineries, we further focused

² Excluding NAICS 32518, Other Inorganic Chemical Manufacturing

attention on Chevron, Shell, Conoco Phillips, Valero, and Tesoro refineries. The numbers of impacted chemical manufacturers and other chemical and allied products wholesalers was determined based upon BAAQMD estimates of the number of tanks and number of facilities with tanks in its jurisdiction.

With this information we began to prepare an economic description of the industry groups of which the impacted sites are a part, as well as to analyze data on the number of jobs, sales levels, the typical profit ratios and other economic indicators for the Bay Area businesses. ADE also reviewed and summarized documents available to the public such as annual reports for publicly traded companies.

With the annual reports and data from the US Economic Census, ADE was able to estimate revenues and profit ratios for many of the sites impacted by the proposed organic liquid storage rule amendments. In calculating aggregate revenues generated by Bay Area refineries, terminals, and chemical manufacturers and wholesalers, ADE first estimated annual revenue based upon available data. Using annual reports and publicly available data, ADE calculated ratios of profit per dollar of sales for the businesses on which the analysis focused. To estimate employment, ADE used employment data from 2002 Economic Census data and Dun & Bradstreet.

The result of the socioeconomic analysis shows what proportion of profit the compliance costs represent. Based on a given threshold of significance, ADE discusses in the report whether the affected sites are likely to reduce jobs as a means of recouping the cost of compliance or as a result of reducing business operations. To the extent that such job losses appear likely, the indirect multiplier effects of the job losses area estimated using a regional IMPLAN input-output model.

3.2 REGIONAL DEMOGRAPHIC TRENDS

The Bay Area experienced moderate population growth from 1995 to 2005. Between 1995 and 2000, the nine-county region increased by nearly 6.7 percent, from 6.3 million in

1995 to almost 6.8 million in 2000. From 1995 to 2005, the population increase was from 6.3 million to close to 7.1 million for an increase of approximately 10.4 percent. At the same time, California had population growth of almost 14 percent.

Within the Bay Area, the greatest percentage increase occurred in Contra Costa County. From 1995 to 2005 Contra Costa increased its population by nearly 15 percent. All other Bay Area counties had population increases slower than the State. The smallest percentage increase occurred in Marin County where population grew less than 5.5 percent from 1995 to 2005. Table 1 shows the population changes that have occurred in the Bay Area and California from 1995 to 2005.

Table 1
Population Growth: San Francisco Bay Area

	Population			Percent Change		
	1995	2000	2005	95-00	00-05	95-00
California	31,617,000	33,871,648	36,728,196	6.66%	7.78%	13.92%
Bay Area	6,329,800	6,783,760	7,067,403	6.69%	4.01%	10.44%
Alameda County	1,332,900	1,443,741	1,500,228	7.68%	3.77%	11.15%
Contra Costa County	869,200	948,816	1,019,101	8.39%	6.90%	14.71%
Marin County	238,100	247,289	251,820	3.72%	1.80%	5.45%
Napa County	116,800	124,279	132,990	6.02%	6.55%	12.17%
San Francisco County	741,600	776,733	792,952	4.52%	2.05%	6.48%
San Mateo County	673,300	707,161	719,655	4.79%	1.74%	6.44%
Santa Clara County	1,568,200	1,682,585	1,752,653	6.80%	4.00%	10.52%
Solano County	368,000	394,542	420,307	6.73%	6.13%	12.44%
Sonoma County	421,700	458,614	477,697	8.05%	3.99%	11.72%

Source: Applied Development Economics, based on household population estimates from The California Department of Finance

3.3 REGIONAL ECONOMIC TRENDS

The Bay Area is one of the world's greatest regional economies. It benefits from pre-eminent knowledge-based industries, with competitive strength flowing from an unmatched culture of entrepreneurship, world-leading research institutions, and some of the nation's best educated and most highly skilled workforce. With these remarkable advantages, it has led through innovation in a wide range of research and industrial fields.

Many of the Bay Area's most prominent industries are manufacturing related. From Intel to PowerBar, Bay Area

manufacturers are often high profile companies with world-renowned recognition. From small to large, Bay Area industry has been dynamic, creating wealth and jobs in both the export sector and local serving industries.

The economic base is typically comprised of export industries within the manufacturing, minerals-resource extraction, and agricultural sectors. There are also the “local support industries” such as retail or service sectors, the progress of which is a function of the economic base and demographic changes, and more so the latter than the former. As population increases in a given area, demand for services – such as realtors, teachers, healthcare – increases, as does demand for basic retail items like groceries, gas for commuting, or clothing at the local apparel shops.

The industries affected by the proposed rule amendments are a prominent part of the region’s economic base. Mainly engaged in export related business, the oil refineries are classified as manufacturers with the firms engaged in chemical manufacturing. In the Bay Area, manufacturing jobs have decreased over the last decade. In 1995, manufacturing accounted for 14.5 percent of all Bay Area employment. By 2005, manufacturing declined 3.5 percent to account for 11 percent of all Bay Area employment.

As of 2005, the professional and business services sector was the largest employer in the region, at 529,100 jobs or 17 percent of all private and public sector jobs. This is a change from 1995 when professional and business services accounted for 16 percent of all Bay Area employment. During the same period, professional and business services increased 14 percent. The next largest industry in the Bay Area is public service, or government, with 468,100 jobs. In 2005, government accounted for 15 percent of all Bay Area employment. From 1995 to 2005, government had one of the lowest growth rates of all industries at less than 6 percent. Two other industries came close to manufacturing in total employment. Retail trade and education & health care both made up 11 percent of total employment and had only a few thousand jobs less than manufacturing. Unlike manufacturing, both retail trade and education & health care had significant job gains from 1995 to 2005. All other

industries made up less than manufacturing in total employment in 2005. Table 2 shows Bay Area industry sectors and their trends from 1995 to 2005.

Table 2
Employment Profile of the San Francisco Bay Area, 1995-2005

Industry	1995	2000	2005	% of Total Employment in 2004
Farm	21,100	25,800	20,000	1%
Natural Resources & Mining	2,920	4,600	4,560	0%
Construction	105,200	165,700	164,100	5%
Manufacturing	428,800	484,500	351,300	11%
Wholesale Trade	121,700	138,800	122,900	4%
Retail Trade	304,900	350,600	336,600	11%
Transportation, Warehousing and Utilities	116,600	125,600	100,400	3%
Information	92,100	151,600	112,300	4%
Financial Activities	189,300	198,500	213,000	7%
Professional and Business Services	464,400	670,300	529,100	17%
Educational and Health Services	299,300	334,300	361,600	11%
Leisure and Hospitality	260,400	297,700	311,000	10%
Other Services	100,700	110,800	109,900	3%
Government	442,100	465,200	468,100	15%
Total	2,949,520	3,524,000	3,204,860	100%

Source: Applied Development Economics from data supplied by the Labor Market Information Division of the California Employment Development Department

3.4 DESCRIPTION OF AFFECTED INDUSTRIES

The proposed storage of organic liquids rule amendments affect industries in the following NAICS codes:

- NAICS 32411, Petroleum Refineries
- NAICS 325, Chemical Manufacturing³
- NAICS 42471, Petroleum Bulk Stations and Terminals
- NAICS 42469, Other Chemical and Allied Products Merchant Wholesalers

What follows is a description of these industries, along with their economic trends in the Bay Area, and it provides a comparison between 2001 and 2005. Data in Table 3 are for all sources, not just the major sites that have been focused on in the Bay Area. As shown in Table 3, employment in petroleum refineries decreased by 7 percent in the five years from 2001 to 2005. Though employment in this industry decreased during this period, it fared much better than the overall manufacturing sector. Between 1995 and 2005, Bay Area manufacturing lost almost 110,000 jobs, a 31 percent decline. In California, petroleum refinery jobs declined 8 percent during the same period and manufacturing jobs declined 19 percent.

³ Excluding NAICS 32518, Other Inorganic Chemical Manufacturing

Table 3
Employment Trends: Industries Affected by Proposed Amendments, 2001 - 2004

	2001	2005	Change from 2001 to 2005	% Change from 2002 to 2005
San Francisco Bay Area				
MANUFACTURING	460,992	351,005	(109,987)	-31%
Petroleum Refineries	6,424	6,031	(393)	-7%
Chemical Manufacturing	19,262	20,301	1,039	5%
WHOLESALE TRADE	135,225	124,558	(10,667)	-9%
Other Chemical and Allied Products	2,396	2,229	(167)	-7%
Petroleum Bulk Stations and Terminals	175	137	(38)	-28%
California				
MANUFACTURING	1,780,544	1,498,373	(282,171)	-19%
Petroleum Refineries	13,447	12,498	(949)	-8%
Chemical Manufacturing	78,565	79,312	747	1%
WHOLESALE TRADE	652,986	671,015	18,029	3%
Other Chemical and Allied Products	9,010	8,547	(463)	-5%
Petroleum Bulk Stations and Terminals	1,589	1,835	246	13%

Source: California Employment Development Department, Quarterly Census of Employment and Wages; calculations by Applied Development Economics

According to the data in Table 3, employment at Bay Area petroleum bulk stations and terminal facilities (also in the Manufacturing sector) declined 28 percent between 2001 and 2005. This particular data set reports Bay Area petroleum bulk stations and terminal facilities employed only 137 workers in 2005. A separate data set (Dun and Bradstreet's "Zapdata.com"), used later in this report to estimate employment at the specific sites on which this analysis focuses, indicates that employment at these sites alone totals 263. During the same period (2001 – 2005), statewide employment in the Petroleum Bulk Stations and Terminal Facilities industry grew by 13 percent.

The data from the Quarterly Census of Employment and Wages indicates that the Chemical Manufacturing industry in the Bay Area outperformed the state in terms of employment growth during the period 2001 – 2005. In 2001, 19,262 people were employed in this industry in the Bay Area. By

2005, it had expanded by 5 percent to over 20,000. Statewide however, this industry grew only 1 percent, adding 747 jobs between 2001 and 2005.

Bay Area firms engaged in wholesaling other “chemicals and allied products” performed comparably to their statewide counterparts in terms of employment. Statewide, firms in this industry decreased employment by 5 percent. In the Bay Area, employment declined 7 percent, from 2,396 employees in 2001 to 2,229 in 2005.

Table 4 identifies the economic characteristics of the specific sites affected by the proposed storage of organic liquids rule amendments.⁴ This table shows that the refineries, chemical manufacturers, terminal facilities, and chemical and allied products wholesalers are estimated to employ 1,712 workers, 6,996 workers, 753 workers, and 758 workers respectively. These sites have an estimated aggregate payroll of \$1.4 billion, and estimated revenues of \$10.6 billion. In calculating aggregate revenues generated by impacted businesses, the consultant estimated an average revenue figure per business in each industry based on data from the 2002 Economic Census. Then, the consultant summed the businesses’ estimated revenue to arrive at the aggregate amount of \$10.6 billion.

⁴ BAAQMD estimates that there are 301 facilities with organic liquid storage tanks; and, that approximately half of the tanks are exempt from Rule 5. Additionally, BAAQMD estimates that 47 of the facilities account for 73 percent of the tanks. Using these estimates, the consultant estimated the weighted number of tanks per facility and, assuming that the 47 facilities that account for 73 percent of the tanks do not have any exempt tanks, estimated the number of chemical manufacturers and other chemical and allied products wholesalers that would be impacted by the proposed rule amendments.

Table 4
Economic Characteristics of Impacted Businesses in the San Francisco Bay Area

	No. of Businesses	Estimated Sales	Estimated Employment	Estimated Payroll
Petroleum Refineries	5	\$4,924,891,104	1,712	\$203,809,402
Chemical Manufacturing	112	\$1,779,127,768	6,996	\$1,035,661,305
Petroleum Bulk Stations and Terminal Facilities	23	\$3,682,600,000	753	\$49,612,026
Other Chemicals and Allied Products	34	\$182,812,020	758	\$71,329,728
Total	174	\$10,569,430,892	10,219	\$1,360,412,461

Source: U.S. Economic Census 2002; California Employment Development Department Quarterly Census of Employment and Wages; Dunn and Bradstreet; Calculations by Applied Development Economics

As Table 5 shows, the impacted refinery sites represent 28 percent of all employment within their respective industry in the Bay Area. Overall, there are an estimated 6,031 petroleum refining employees in the Bay Area. Of the 6,031 workers, 1,712 work in the impacted refineries, or 28 percent. In all of California, there were 12,498 workers in NAICS 32411, meaning that the affected Bay Area refineries equal 14 percent of the state oil refinery workforce.

Table 5
Employment at Impacted Sites Relative to Bay Area and California

	No. of Businesses	Estimated Employment	Impacted Sites as a % of Bay Area Total	Impacted Sites as a % of California Total
Petroleum Refineries	5	1,712	28%	14%
Chemical Manufacturing	112	6,996	34%	9%
Petroleum Bulk Stations and Terminal Facilities	23	753	100%	41%
Other Chemicals and Allied Products	34	758	34%	9%
Total	174	10,219	35%	10%

Source: U.S. Economic Census 2002; California Employment Development Department Quarterly Census of Employment and Wages; Dunn and Bradstreet Calculations by Applied Development Economics

Within the Bay Area, the impacted chemical manufacturing firms account for 34 percent of the total employment in their industry. This is the largest proportion of all of the affected groups within their respective industries. Statewide, however, the impacted chemical manufacturers account for only 9 percent of the total employment in their industry. The same is true for the other chemical and allied products wholesalers at both the Bay Area and statewide levels.

Based upon the Dun and Bradstreet data used in Table 4, Bay Area petroleum bulk stations and terminal facilities employ approximately 753 people. It is expected that all 23 of these establishments will be impacted by the proposed rule amendments. Bay Area employment accounts for 41 percent of this sector's statewide employment.

3.5 COMPLIANCE COSTS

For the most part, the proposed amendments to Regulation 8, Rule 5 are not expected to result in increased compliance costs. Most of the amendments are either editorial or address activities that are already conducted or would be expected to be performed by tank operators under current conditions. The voluntary self-inspection and repair program, however, is expected to result in a slight increase in compliance costs for those that choose to participate.

The District estimates that there are approximately 500 floating roof tanks in its jurisdiction. With two inspections per year on 25% of the tanks, there would be 250 additional inspections per year assuming all 500 tanks are included in the program. A tank inspector would need about an hour and a half to inspect a tank. Assuming an annual cost of \$65,000 per inspector and 2000 working hours per year, each inspection would cost approximately \$48.75, with a \$12,187 total annual cost for the additional inspections. Table 6 below details the methodology for this cost estimate.

Table 6
Estimated Cost of Compliance

No. of tanks in District	Cost per Inspector (\$ per year)	Working hours per year	Inspection Time (Hours)	No. of Inspections/Year (500 tanks*25%*2)	Cost per Inspection [(\$65,000/2000)*1.5]	Est. Annual Compliance Cost (\$48.75*250)
500	\$ 65,000	2000	1.5	250	\$ 48.75	\$ 12,187.50

Source: BAAQMD Staff Report titled, "District Regulation 8, Rule 5: Storage of Organic Liquids" (September 8, 2006)

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3.6 BUSINESS RESPONSE TO COMPLIANCE COSTS

Sites impacted by the proposed storage of organic liquids rule amendments may respond in a variety of ways when faced with new regulatory costs. These responses may range from simply absorbing the costs and accepting a lower rate of return to shutting down the business operation all together. Businesses may also seek to pass the costs on to their customers in the form of higher prices, although, at least in the oil industry, prices are set in global markets and individual producers or refineries are not in a position to affect prices. More likely, they may renew efforts to increase productivity and reduce costs elsewhere in their operation in order to recoup the regulatory costs and maintain profit levels.

3.7 IMPACT ANALYSIS

The businesses' responses to increased compliance costs hinge on the effect of the costs on the profits generated at the affected sites. An impact on estimated profits greater than 10 percent implies that the source would experience serious economic effects because of the compliance cost. When compliance costs are greater than 10 percent of estimated profits, companies typically respond to the impact by laying off some workers, closing parts of manufacturing facilities or, in the most drastic case, possibly closing the manufacturing facility.

Using the compliance cost estimates developed for the proposed storage of organic liquids rule amendments ADE calculated the socioeconomic impacts of the proposed actions. In calculating impacts on profits, ADE used return on sales ratios identified by media reports and in annual reports of companies directly affected by the proposal. Based on this information, we estimate that the impacted businesses generated a combined profit of \$502.5 million on \$10.6 billion in revenues.

Table 7 details the projected impacts of compliance with the proposed voluntary self-inspection and repair program on

affected site profits. The estimated annual compliance cost of \$12,187.50 represents less than one percent of profits for the impacted businesses in each of the impacted industries. The greatest impact on profits is expected to be experienced by the impacted other chemical and allied products wholesalers. However, even this impact is only expected to be 0.247 percent of profits.

Table 7
Impact of Estimated Compliance Cost on Estimated Profits at Bay Area Businesses

	No. of Businesses	Estimated Profits	Annual Compliance Cost	Cost as % or Profits
Petroleum Refineries	5	\$344,742,377	12,188	0.004%
Chemical Manufacturing	112	\$53,373,833	12,188	0.023%
Petroleum Bulk Stations and Terminal Facilities	23	\$99,430,200	12,188	0.012%
Other Chemicals and Allied Products	34	\$4,935,925	12,188	0.247%
Total	174	\$502,482,335	12,188	0.002%

Source: Calculations by Applied Development Economics, based on a 7 percent profit margin for Petroleum Refineries, 2.7 percent of Petroleum Bulk Stations and Terminal Facilities, 3 percent for Chemical Manufacturing, and 2.7 percent for Other Chemicals and Allied Products

It is believed that the profit impacts shown in Table 7 are conservative (i.e. higher than will actually be realized). The estimates of profit impacts assume that each industry bears the full cost of compliance. It is more likely that the total \$12,187 annual compliance cost will be spread between sites in all four impacted industries. Therefore, it is most likely that no one set of affected sites will carry the full cost of compliance with this proposed amendment.

3.8 IMPACT ON SMALL BUSINESS

In addition to analyzing the employment impacts of the proposed storage of organic liquids rule amendments, state legislation requires that the socioeconomic analysis assess whether small businesses are disproportionately affected by air quality rules. First, this section begins with a definition of small business per California Statute. It then analyzes the proportion of small to large petroleum refinery businesses. The per employee cost of compliance with the proposed voluntary self-inspection and repair program for these facilities is calculated and used to estimate the proportion of

the total annual compliance cost that will be incurred by small businesses in this sector. The analysis shows that small businesses are not disproportionately affected by this proposed amendment. This section then proceeds to do the same for the Petroleum Bulk Storage and Terminal Facilities, Chemical Manufacturing, and Other Chemicals and Allied Products (Wholesale Trade) industries.

DEFINITION OF SMALL BUSINESS PER CALIFORNIA STATUTE

For purposes of qualifying small businesses for bid preferences on state contracts and other benefits, the State of California defines small businesses in the following manner:

- Must be independently owned and operated;
- Cannot be dominant in its field of operation;
- Must have its principal office located in California
- Must have its owners (or officers in the case of a corporation) domiciled in California; and,
- Together with its affiliates, be either:
 - A business with 100 or fewer employees, and an average gross receipts of \$10 million or less over the previous tax years, or
 - A manufacturer with 100 or fewer employees

PETROLEUM REFINERIES

According to Dun and Bradstreet, there are 33 Bay Area businesses operating in the Petroleum Refineries industry⁵. Combined these firms employ 5,170 people. Twenty-three (70 percent) of the 43 firms employ less than 100 workers

⁵ Dunn and Bradstreet data is collected through business surveys. The data for each industry includes all businesses that both operate in that industry and that responded to the survey. A business reported as operating in a particular industry is not necessarily primarily engaged in that industry; it's primary business may be in a separate, but related industry.

and have gross receipts (sales) of less than \$10 million annually. These 23 firms qualify as small businesses and employ a combined 106 workers. Table 8 illustrates the expected distribution of the annual cost to comply with the proposed voluntary self-inspection and repair program between small and medium-large businesses in this sector.

Table 8
Share of Annual Cost to Comply with Voluntary Self-Inspection and Repair Program, by Business Size Category

Business Size Category	No. of Businesses	% of Total Businesses	No. of Employees	Per Employee Compliance Cost	Annual Compliance Cost	% of Total Compliance Cost
Small Businesses	23	70%	106	\$2.36	\$249.88	2%
Mid - Large Businesses	10	30%	5,064	\$2.36	\$11,937.62	98%
Total	33	100%	5,170	\$2.36	\$12,187.50	100%

Source: Dun and Bradstreet's "Zapdata.com;" calculations by Applied Development Economics

Since all 33 petroleum operations in the Bay Area employ a combined 5,170 workers, compliance with the proposed expansion of rule requirements to other materials, with a total annual cost of \$12,187.50, is expected to cost Bay Area firms in this sector \$2.36 per employee on an annual basis. On a per employee basis, compliance will cost small businesses in this sector, which employ 106 people, a combined \$249.88 annually. Since small businesses account for 70 percent of the Bay Area firms in this sector and are only expected to incur 2 percent of the total estimated annual compliance cost, it is determined that small businesses will not be disproportionately affected by this proposed amendment.

PETROLEUM BULK STORAGE AND TERMINAL FACILITIES

According to Dun and Bradstreet, there are 23 Bay Area businesses operating in the Petroleum Bulk Stations and Terminal Facilities industry. Combined these firms employ 753 people. Eighteen (78 percent) of the 23 firms employ less than 100 workers and have gross receipts (sales) of less than \$10 million annually. These eighteen firms qualify as small businesses and employ a combined 118 workers. Table 9 illustrates the expected distribution of the annual cost to comply with the proposed voluntary self-inspection and

repair program between small and medium-large businesses in this sector.

Table 9
Share of Annual Cost to Comply with Voluntary Self-Inspection and Repair Program, by Business Size Category

Business Size Category	No. of Businesses	% of Total Businesses	No. of Employees	Per Employee Compliance Cost	Annual Compliance Cost	% of Total Compliance Cost
Small Businesses	18	78%	118	\$16.17	\$1,908.45	16%
Mid - Large Businesses	5	22%	635	\$16.17	\$10,270.05	84%
Total	23	100%	753	\$16.17	\$12,187.50	100%

Source: Dun and Bradstreet's "Zapdata.com;" calculations by Applied Development Economics

Since all 23 terminal facilities in the Bay Area employ a combined 753 workers, compliance with the proposed expansion of rule requirements to other materials, with a total annual cost of \$12,187.50, is expected to cost Bay Area firms in this sector \$16.17 per employee on an annual basis. On a per employee basis, compliance will cost small businesses in this sector, which employ 118 people, a combined \$1,908.45 annually. Since small businesses account for 78 percent of the Bay Area firms in this sector and are only expected to incur 16 percent of the total estimated annual compliance cost, it is determined that small businesses will not be disproportionately affected by this proposed amendment.

CHEMICAL MANUFACTURERS

Utilizing the same Dun and Bradstreet, there are 817 Bay Area businesses operating in the Chemical Manufacturing industry. Combined these firms employ 29,588 people. Over 600 (78 percent) of the firms employ less than 100 workers and have gross receipts (sales) of less than \$10 million annually. These 629 firms qualify as small businesses and employ a combined 3,401 workers. Table 10 illustrates the expected distribution of the annual cost to comply with the proposed voluntary self-inspection and repair program between small and medium-large businesses in this sector.

Table 10 Share of Annual Cost to Comply with Voluntary Self-Inspection and Repair Program, by Business Size Category						
Business Size Category	No. of Businesses	% of Total Businesses	No. of Employees	Per Employee Compliance Cost	Annual Compliance Cost	% of Total Compliance Cost
Small Businesses	629	77%	3,401	\$0.41	\$1,400.90	11%
Mid - Large Businesses	188	23%	26,187	\$0.41	\$10,786.60	89%
Total	817	100%	29,588	\$0.41	\$12,187.50	100%

Source: Dun and Bradstreet's "Zapdata.com;" calculations by Applied Development Economics

Since all 817 chemical manufacturers in the Bay Area employ a combined 29,588 workers, compliance with the proposed expansion of rule requirements to other materials, with a total annual cost of \$12,187.50, is expected to cost Bay Area firms in this sector \$0.41 per employee on an annual basis. On a per employee basis, compliance will cost small businesses in this sector, which employ 3,401 people, a combined \$1,400.90 annually. Since small businesses account for 77 percent of the Bay Area firms in this sector and are only expected to incur 11 percent of the total estimated annual compliance cost, it is determined that small businesses will not be disproportionately affected by this proposed amendment.

OTHER CHEMICALS AND ALLIED PRODUCTS

WHOLESALE

Utilizing the same Dun and Bradstreet, there are 301 Bay Area businesses operating in the Other Chemicals and Allied Products wholesale industry. Combined these firms employ 3,155 people. Almost all (96 percent) of the firms employ less than 100 workers and have gross receipts (sales) of less than \$10 million annually. These 289 firms qualify as small businesses and employ a combined 1,700 workers. Table 10 illustrates the expected distribution of the annual cost to comply with the proposed voluntary self-inspection and repair program between small and medium-large businesses in this sector.

Table 11 Share of Annual Cost to Comply with Voluntary Self-Inspection and Repair Program, by Business Size Category						
Business Size Category	No. of Businesses	% of Total Businesses	No. of Employees	Per Employee Compliance Cost	Annual Compliance Cost	% of Total Compliance Cost
Small Businesses	289	96%	1,700	\$3.86	\$6,566.96	54%
Mid - Large Businesses	12	4%	1,455	\$3.86	\$5,620.54	46%
Total	301	100%	3,155	\$3.86	\$12,187.50	100%

Source: Dun and Bradstreet's "Zapdata.com;" calculations by Applied Development Economics

Since all 301 other chemicals and allied products wholesalers in the Bay Area employ a combined 3,155 workers, compliance with the proposed expansion of rule requirements to other materials, with a total annual cost of \$12,187.50, is expected to cost Bay Area firms in this sector \$3.86 per employee on an annual basis. On a per employee basis, compliance will cost small businesses in this sector, which employ 1,700 people, a combined \$6,566.96 annually. Since small businesses account for 96 percent of the Bay Area firms in this sector and are only expected to incur slightly more than half (54 percent) of the total estimated annual compliance cost, it is determined that small businesses will not be disproportionately affected by this proposed amendment.

APPENDIX A: OTHER PROPOSED AMENDMENTS

3.6.1 NEW SECTIONS 8-5-111.6, 112.5

New notification requirements are proposed to be added to limited exemptions in Sections 8-5-111 and 112. These requirements apply only in the event the tank operator discovers a condition that violates a standard of Rule 5. Such a notification is important because both of these limited exemptions require a tank to be in compliance with the rule when they are invoked.

3.6.2 NEW SECTION 8-5-112.6

At the request of U.S. EPA, a report requirement is proposed to be added to the limited exemption in Section 112.

3.6.3 NEW SECTION 8-5-118

This section clarifies the applicability of Rule 5 relative to Regulation 8, Rule 18: *Equipment Leaks*. Both rules include standards that limit equipment leaks.

3.6.4 AMENDED SECTION 8-5-206

The current definition of “gas tight” allows concentrations of organic gases at leaking equipment to be measured as much as 1 centimeter from the leak. Because federal guidelines require leak concentrations to be measured as closely as possible to the leak, the 1 centimeter allowance is deleted in the proposed amendment.

3.6.5 AMENDED TABLE IN SECTION 301

The deletions in the second and third rows of this table are editorial. Section 301 specifies that a tank in a particular size that stores a liquid in a particular vapor pressure range may use the emission control measures specified for that tank and liquid, or may use measures specified for larger tanks or for tanks storing liquids in a higher vapor pressure range. Because of this, the deleted text in the second and thirds rows is duplicative. This is an editorial change.

The deleted text in the first row and the added text in the third row is a correction to the rule amendment adopted in November 2002. In that amendment, rule standards were put into the tabular format that is currently used. However, when this format change occurred, a compliance option for the two smallest tank size categories was inadvertently deleted. Tanks in these two size categories that store liquid with a true vapor pressure greater than 1.5 psia and less than 11 psia were allowed, prior to the 2002 amendment, to use a submerged fill pipe as a minimum emission control technology, if they were in the service specified. This change was inadvertent and was not discussed in the staff report for the 2002 amendment. No tank operators submitted permit applications to retrofit affected tanks with more effective emission control technology, and BAAQMD staff is unaware of any tanks that were subsequently retrofitted. Therefore, reversing this error will not allow any tank to revert to a lower level of emission control and this change is editorial.

3.6.6 AMENDED SECTION 8-5-303.2, 304.4, 305.5

The proposed amendments deleted the requirement that pressure vacuum valves and floating roofs be “properly installed and properly maintained”. Rule 5 includes adequate monitoring to ensure compliance with all rule standards. The requirement for proper installation and maintenance is unnecessary.

3.6.7 NEW SECTIONS 307.3, 320.7; AMENDED SECTION 8-5-303.2

Pressure vacuum valves and other pressure relief devices are required to have a sealing mechanism that is “gas tight” and are required to be monitored for compliance with this standard. However, when a sealing mechanism is vented to a fuel gas collection system or other control device that maintains a high emission control efficiency it may be impossible to verify compliance with this standard, and compliance becomes much less important than if the sealing mechanism is vented to the atmosphere. Therefore, the proposed amendments exempt pressure relief devices from

the “gas tight” requirement when any leaks would be vented to a system that proves at least 95% abatement efficiency.

3.6.8 AMENDED SECTION 8-5-320.5.2

This proposed amendment is a correction to the rule amendment adopted in November 2002. Prior to that amendment, this amendment was applicable only to external floating roof tanks. In 2002 this section was amended to delete the qualifier “on an external floating roof”. This change was inadvertent and was not discussed in the staff report for the 2002 amendment. No tank operators submitted permit applications to retrofit internal floating roof tanks, and BAAQMD staff is unaware of any tanks that were subsequently retrofitted. Therefore, reversing this error will not allow any tank to revert to a lower level of emission control and this change is editorial.

3.6.9 AMENDED SECTION 8-5-328.1

The proposed amendments delete the reference to liquid balancing as a control option for tank degassing. As defined in the rule, liquid balancing is a method of making a tank exempt from the requirements of the rule by reducing the true vapor pressure of the stored liquid to less than 0.5 psia. As such, liquid balancing is not a control option for degassing; it is a way to make the tank exempt from the degassing control requirements, as well as the rest of the rule. This proposed deletion will not disallow liquid balancing; it will simply delete this inappropriate reference. This change is editorial.

3.6.10 AMENDED SECTION 8-5-603.1

The proposed amendments replace test method ST-4 with ST-7. Method ST-4 has been superseded by ST-7 in the BAAQMD Manual of Procedures.